

## APPENDIX C.2: FIELD FORMS STREAM SITES

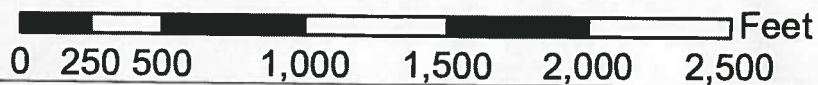
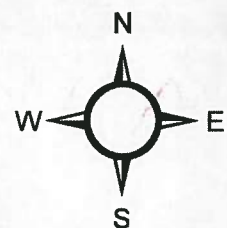
# Restoration Site CATO-2018-STRE-0001



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0001

Reach Number: 1

Current Weather: Sunny, dry, hot

Team Initials: MV, VH

Date: 7/10/18

Past Weather (24 hrs): Sunny, dry









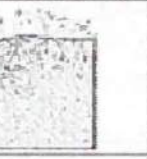






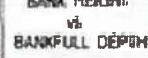

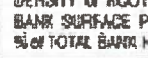
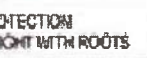
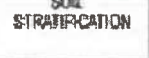
Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
4	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	FAR
2	NF	F
3	NF	
4	NF	
5	FAR	
6	NF	
7	NF	
8	FAR	

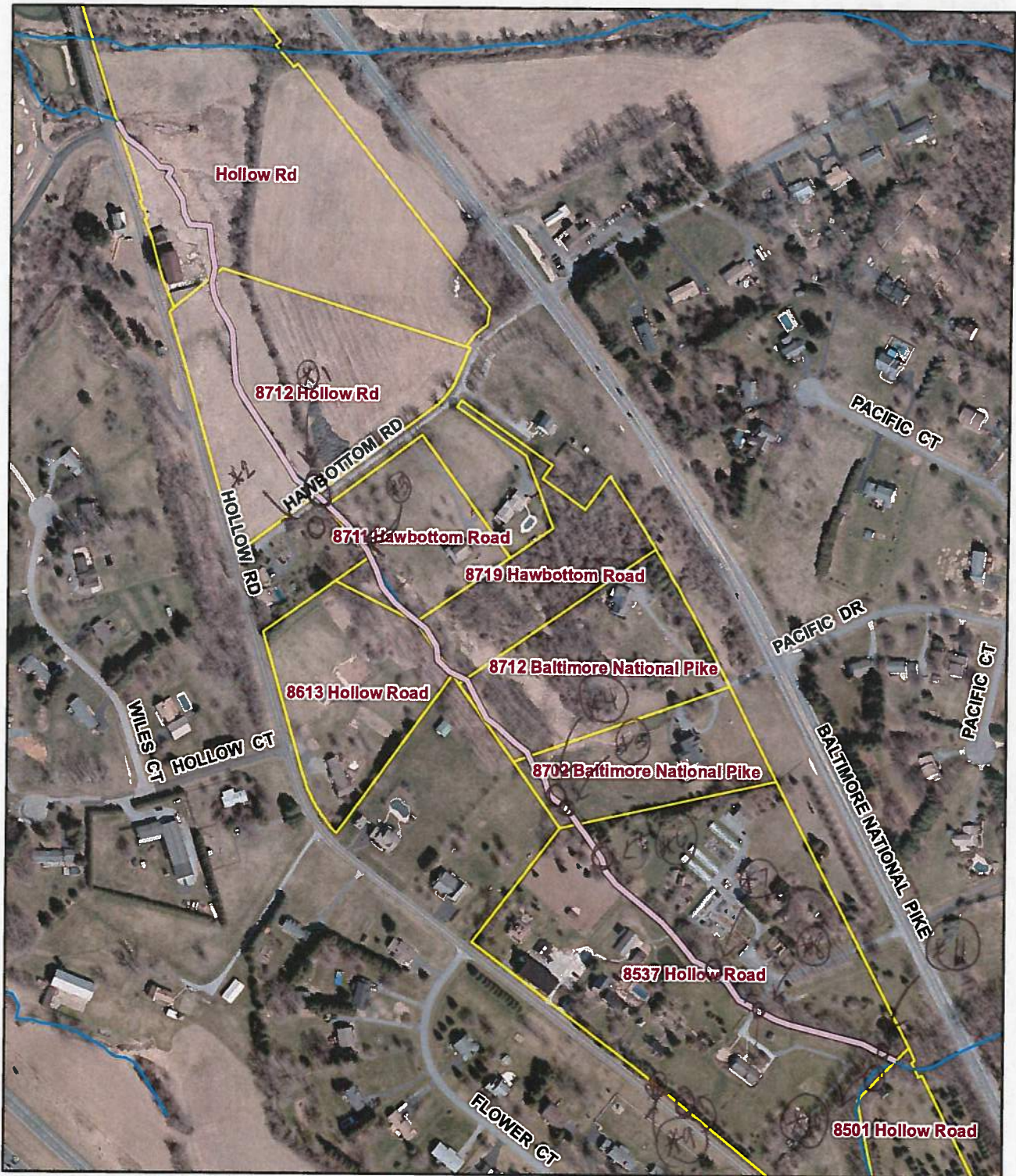
## Holter Road

- Stream Restoration Potential (Circle one) – None Low Medium **High** Length is ~3,300 LF
  - Is there potential for floodplain reconnection? (Circle one) - **Yes** No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
 Proposed project extends from confluence just DS of Ed Smith Property up to ~~small ditch near Daisy property~~. If permission is obtained from Daisy, could extend project to Holter Rd. Access from Smith driveway would be easiest. Floodplain reconnection feasible for most of the length of the stream, but may be difficult adjacent to Smith Pond. Some tree impacts along western side of Thayer property.
  - Other Restoration Opportunities Present (Circle one) – None One Several
    - If opportunities present, list types and locations (and mark on map):  
 - Tree Planting in floodplain along entire stretch of stream. Cattle already largely fenced out on Smith property.  
 Don wants to note that the stream may be eroding the embankment for the pond that is just downstream of Holter Rd., but we were unable to verify due to not having permission during the field visit.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
						
						
		BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

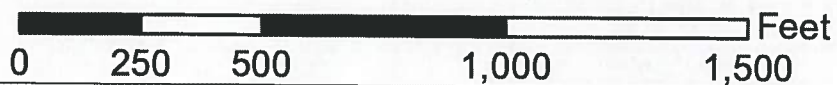
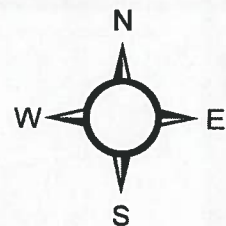
# Restoration Site CATO-2018-STRE-0002



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



(#1) 66" corrugated metal pipe beneath roadway covered in concrete

(#2) 6-8" PVC pipe on East Bank

(#3) confluence?

(#4) decent sized tributary entering stream from ~~East~~ West

(#5) 4" PVC pipe on ~~East~~ West bank high flow

(#6) 6" PVC pipe from ~~East~~ West  
↳ from pond

(#7) gully inflow (currently dry)

(#8) 36" corrugated metal pipe

(#9) " pipe beneath Hollow Rd  
comp deformed → vertically ~ 10-11"  
horizontally ~ 18"

(#10) ephemeral channel

(#11) 4" PVC pipe unbedded in ~~East~~ West Bank

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0008

Reach Number: 1

Current Weather: Sunny, dry, warm

Team Initials: MV, VK

Date: 7/20/18

Past Weather (24 hrs): Sunny, dry

mainly under drains from adjacent fields + pond outfall pipe

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat, suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Leaves + wood present, but often covered in sediment

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	FAR	FAR
2	NF	F
3	NF	F
4	NF	F
5	FAR	F
6	NF	F
7	F	F
8	FAR	F

- Stream Restoration Potential (Circle one) – None Low **Medium** High

- Is there potential for floodplain reconnection? (Circle one) - Yes **No**

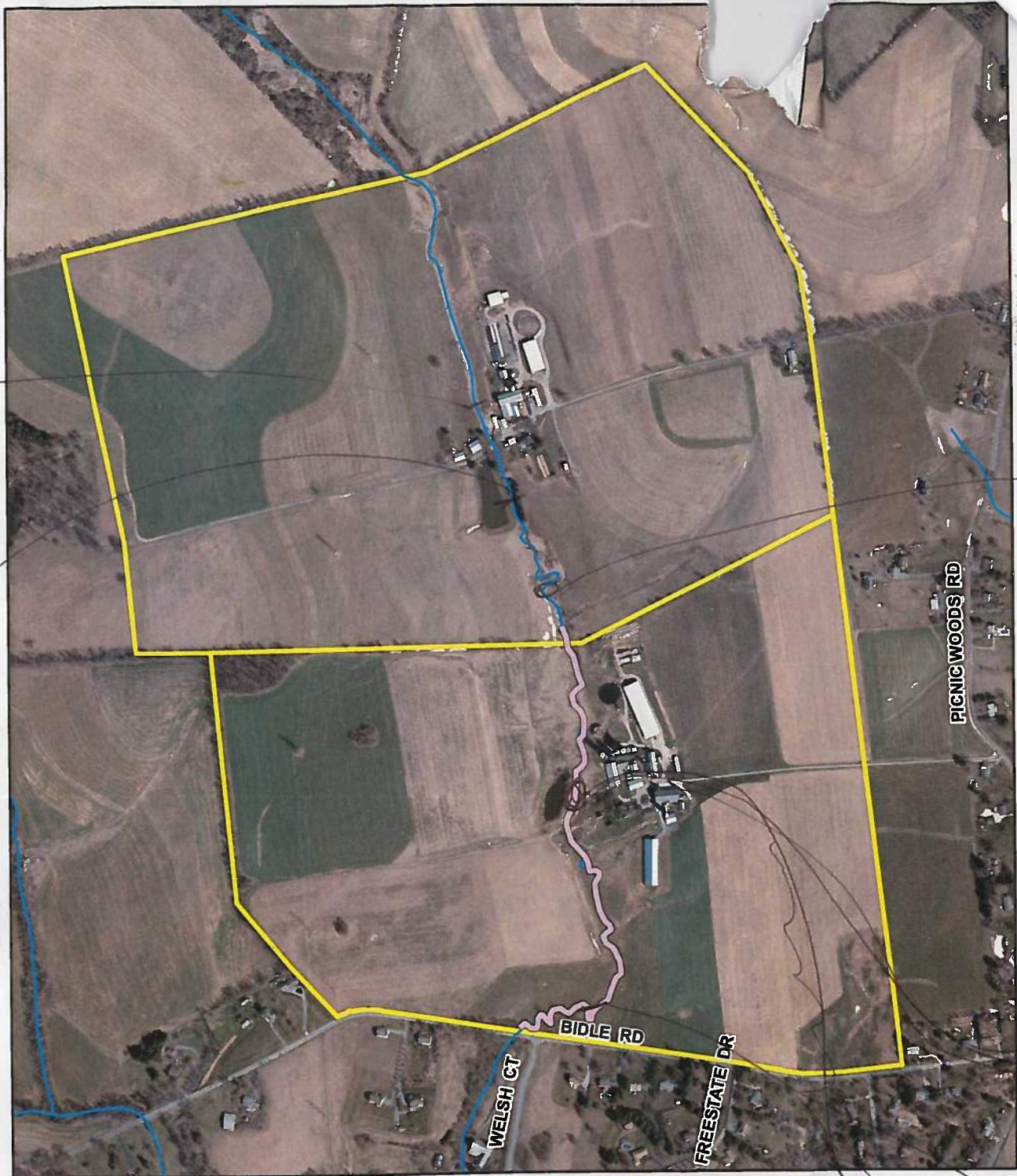
- Restoration Notes (project type, constraints, access, environmental impacts, etc.):

Project can extend from 8920 Bredhorn Church Rd. driveway/DS to confluence US of Pond. There are several (at least 3) land cuts throughout the reach that are leaving a wake of destruction DS. Project can be accessed from driveway, but several large trees will need to be removed. A natural channel design project is recommended for most of the reach, with a step pool connection upstream.

- Other Restoration Opportunities Present (Circle one) – **None** One Several
- If opportunities present, list types and locations (and mark on map):




## Bank Erosion Hazard Index (BEHI)

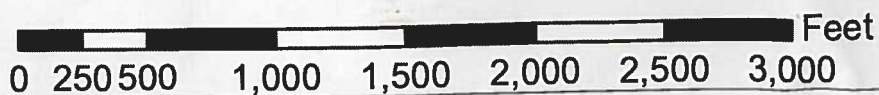
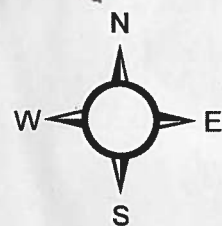
BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE



## Catoctin Creek Watershed Assessment



-  Streams
-  Restoration Opportunity
-  Parcel Boundaries



Pipe across stream

Sediment cover by stream bed

seepage

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0016

Reach Number: US Reach

Current Weather: sunny, hot, dry

Team Initials: MV, VIT

Date: 7/10/18



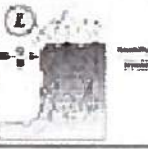

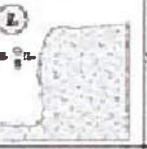

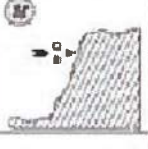

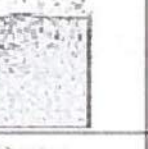
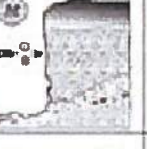

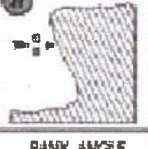
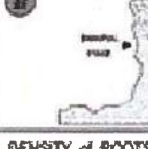
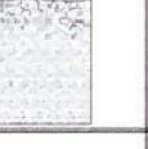

Past Weather (24 hrs): sunny, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
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<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
2	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
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<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	FAR
2	FAR	FAR
3	NF	F
4	FAR	F
5	FAR	F
6	FAR	FAR
7	NF	F
8	NF	F

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) Yes ~~No~~  
*It's possible, but could be difficult along much of the site due to thinner valley.*
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
*This reach includes everything upstream of the Richvale farm gravel driveway. Livestock are fenced out of the stream along this stretch. Most banks are well vegetated, but very few trees are present. Aquatic life is abundant. Valley not very conducive to floodplain reconnection, could do some localized stabilization in eroded spots, but tree planting is probably best bet.*
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):  
*Plant trees in floodplain*

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

## Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0016

Team Initials: MV, VH

Reach Number: DS reach (below R: huala

Date: 7/10/18

Current Weather:

drive way (rushing)

Past Weather (24 hrs):

Sunny, dry

Sunny, hot, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
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Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	FAR	FAR
2	NF	F
3		F
4		F
5		F
6		F
7		F
8		F

- Stream Restoration Potential (Circle one) – None Low Medium **High**

Project Length is ~ 1700 LF

- Is there potential for floodplain reconnection? (Circle one) **Yes** No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):

Proposed project extends from Rihode gravel driveway crossing down to Bidle Rd. Access from gravel driveway. Project can consist of reconnection to floodplain, tree planting, and livestock fencing in floodplain. An exposed pipe (iron? clay?) at large meander bend may need to be protected or removed as part of project. A few existing trees would be impacted by project. Poor WQ in reach due to cow access, very turbid + lots of algae.

- Other Restoration Opportunities Present (Circle one) – None **One** Several

- If opportunities present, list types and locations (and mark on map):

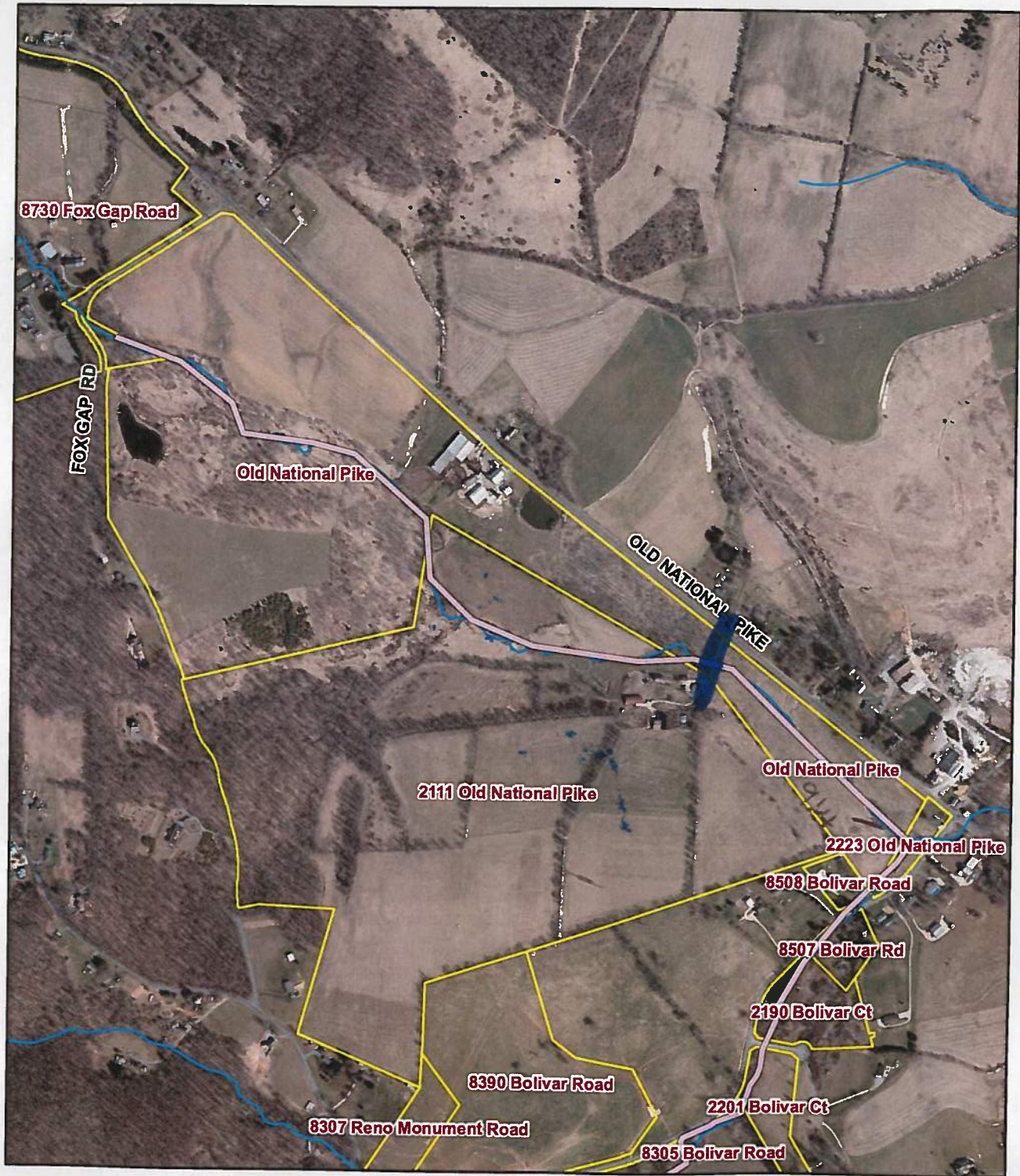
Potential to add linear practice to slope that discharges to stream, but DA may be too large.

Abundant aquatic life observed upstream of driveway crossing. Could add culvert as part of restoration project to allow for easier passage of aquatic life.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW				
	MODERATE				
	HIGH				

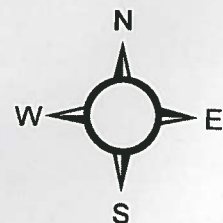
# Restoration Site CATO-2018-STRE-0018



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 1,500 2,000 2,500 3,000 Feet

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0018/0020  
 Reach Number:  
 Current Weather: sunny, hot, dry

Team Initials: MV, CF  
 Date: 7/3/18  
 Past Weather (24 hrs): sunny, hot, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
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Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	FAR
2	NF	FAR
3	NF	FAR
4	NF	FAR
5	FAR	FAR
6	FAR	FAR
7	NF	FAR
8	NAR	FAR

- Stream Restoration Potential (Circle one) – None Low Medium **High** ~ 2,200 LF  
800 along main stem  
1,500 along trib
  - Is there potential for floodplain reconnection? (Circle one) – **Yes** No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
Proposed project includes main channel between Bolivar Rd. and Old Mahanul Pike, and trib that runs along US-40 on Brunner property. Most of project can be accessed from gate used to enter Brunner property from Bolivar Rd. Project includes connecting channel to floodplain, planting trees, and providing
- Other Restoration Opportunities Present (Circle one) – **None** One Several livestock fencing
  - If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

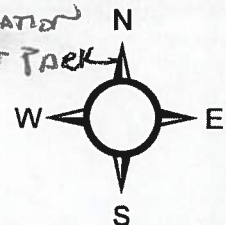
# Restoration Site CATO-2018-STRE-0021



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 Feet

SEWER EASEMENT ADJACENT TO THE WALKING PATH

CONCRETE RETAINMENT AREA

POTENTIAL ANNEXATION TO NORTH OF THE PARK

DRY WEATHER FLOW FROM COMPANY CT?

TRAIL LINE

SAND FILTER?

STAGNANT ON OTHER SIDE

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STAE-002 Team Initials: MV/JS  
 Reach Number: 1 Date: 5/1/18  
 Current Weather: SUNNY 70's Past Weather (24 hrs): SUNNY 70's

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	
2	FAR	
3	NF	
4	FAR	
5	FAR	
6	FAR	
7	FAR	
8	FAR	

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):
    - PROJECT SITE IS PRETTY CONSTRAINED DUE TO PRIVATE PROPERTY & WALKING PATH
    - MAYBE PLANT SOME TREES/SHRUBS TO PROVIDE SHADING
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):
    - POTENTIAL TREE PLANTING

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO - 2018 - STRE - 0021

Reach Number: 2

Current Weather: SUNNY 70's

Team Initials: MV/JS

Date: 5/1/18

Past Weather (24 hrs): SUNNY 70's

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF (MULTIPLE SD PIPES)	
2	FAR	
3	NF	
4	FAR	
6	FAR	
6	F	
2	FAR	
6	FAR	

- Stream Restoration Potential (Circle one) – None Low Medium High

○ Is there potential for floodplain reconnection? (Circle one) - Yes No

○ Restoration Notes (project type, constraints, access, environmental impacts, etc.):

- PROJECT SITE CONSTRAINED DUE TO SEWER LINE, WALKING PATH & PRIVATE PROPERTY

- Other Restoration Opportunities Present (Circle one) – None One Several

○ If opportunities present, list types and locations (and mark on map):

- THERE IS A SD PIPE FROM LARCH CT. WHICH COULD BE DAYLIGHTED UP SLOPE ON WEST SIDE OF PATH & BMP INSTALLED DEPENDING ON D.A. → NEED TO EVAL. DA TO THIS SD.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CTD - 2018-STRE-0021  
 Reach Number: 3  
 Current Weather: SUNNY 70s

Team Initials: MW/JS  
 Date: 5/1/18  
 Past Weather (24 hrs): SUNNY 70s

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
2	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	FAR	
2	NF	
3	FAR (ON ONE SIDE)	
4	NF	
6	FAR	
6	F	
2	FAR	
6	FAR	

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No  
*ONLY ON ONE SIDE*
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):

*- PROJECT SITE VERY CONSTRAINED DUE TO STEEP SLOPE, SEWER LINE, & WALKING PATH*

- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):

*- WETLAND RESTORATION ON WEST SIDE OF WALKING PATH*

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

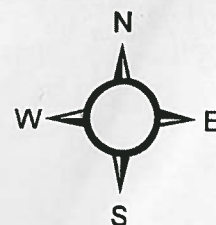
# Restoration Site CATO-2018-STRE-0022



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 Feet

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0022

Reach Number: US Reach

Current Weather: Sunny, hot, dry

Team Initials: MV, VH

Date: 7/10/18

Past Weather (24 hrs): Sunny, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	F
2	FAR	F
3	NF	F
4	FAR	F
5	FAR	F
6	FAR	FAR
7	NF	F
8	FAR	F

- Stream Restoration Potential (Circle one) – None Low Medium High

- Is there potential for floodplain reconnection? (Circle one) - Yes No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):



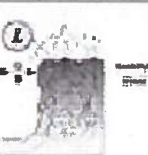

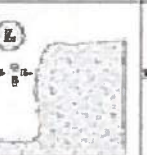

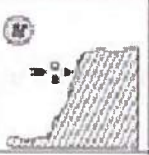

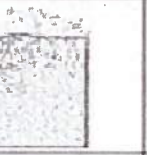
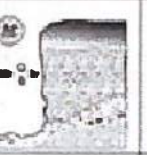



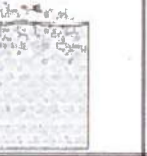

This is the portion of the site where there becomes little to no forested buffer on either side of the stream. Roughly corresponds to northern parcel. Site has a fairly wide floodplain that can be reconnected to the stream in some areas. The issue is access. No easy access due to steep slopes and no existing road to the stream that is DS of Old Middletown.

- Other Restoration Opportunities Present (Circle one) – None One Several

- If opportunities present, list types and locations (and mark on map):

Planting trees in floodplain if not done as part of a stream restoration project.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY OF ROOTS BANK SURFACE PROTECTION % OF TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STR-E-0022

Reach Number: DS reach

Current Weather: Sunny, hot, dry

Team Initials: MV, VHT

Date: 7/10/18

Past Weather (24 hrs): Sunny, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	Concentrated Flow <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	Floodplain Connectivity	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	Riparian Zone (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	Lateral Stability	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	Shelter for Fish and Macroinvertebrates (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	Sediment Supply (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	Temperature/Percent Shading (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	Detritus (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	F
2	NF	F
3	F	F
4	NF	F
5	F	F
6	FAR	FAR
7	F	F
8	F	F

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
*this reach has plenty of floodplain space available for reconnection, but access is a big issue. would need to build an access road along very steep valley wall slopes. Also, would need to access through forested wetland areas. Large size of DA is also an issue.*
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY OF ROOTS BANK SURFACE PROTECTION % OF TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

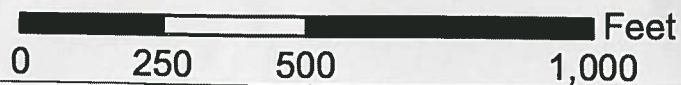
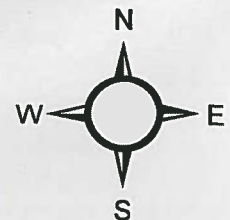
# Restoration Site CATO-2018-STRE-0026



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: *CATO-2018-STRE-0026*  
 Reach Number: *US reach*  
 Current Weather: *Sunny, hot, dry*

Team Initials: *MYCF*  
 Date: *7/3/18*  
 Past Weather (24 hrs): *Sunny, hot, dry*

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	<i>FAR</i>	<i>FAR</i>
2	<i>FAR</i>	<i>F</i>
3	<i>NF</i>	<i>F</i>
3	<i>NF</i>	<i>F</i>
5	<i>FAR</i>	<i>F</i>
8	<i>NF</i>	<i>F</i>
2	<i>FAR</i>	<i>F</i>
8	<i>FAR</i>	<i>F</i>

- Stream Restoration Potential (Circle one) – None Low **Medium** High

- Is there potential for floodplain reconnection? (Circle one) - **Yes** No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):

Proposed project to extend from SWM pond outfall down to second crossing (30" CMP) / trib at second crossing. Access from main driveway or farm road at crossing. Install stop pool conveyance DS of pond in existing eroded outfall, connect stream to floodplain and provide grade control DS of stream to prevent further propagation / formation of headcuts.

- Other Restoration Opportunities Present (Circle one) – None **One** Several

- If opportunities present, list types and locations (and mark on map):

See above re: outfall stabilization

Also potential to extend restoration project up trib seen in aerial.

## Bank Erosion Hazard Index (BEHI)




BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

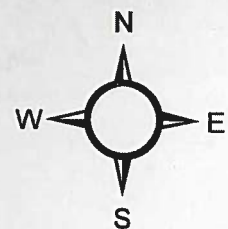
# Restoration Site CATO-2018-STRE-0029



# Catoctin Creek Watershed Assessment



-  Streams
-  Restoration Opportunity
-  Parcel Boundaries



# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: CATO-2018-STRE-0029  
 Reach Number: 1 (Downstream segment)  
 Current Weather: Sunny, dry

Team Initials: MV, CF  
 Date: 6/28/18  
 Past Weather (24 hrs): Small amount of rain on 6/27

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	Concentrated Flow <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	Floodplain Connectivity	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	Riparian Zone (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	Lateral Stability	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	Shelter for Fish and Macroinvertebrates (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	Sediment Supply (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	Temperature/Percent Shading (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	Detritus (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	F
2	NF	F
3	NF	F
4	NF	F
5	FAR	F
6	F	F
7	NF	F
8	FAR	F

- Stream Restoration Potential (Circle one) – None Low Medium High

- Is there potential for floodplain reconnection? (Circle one) Yes No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):









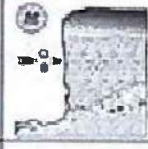
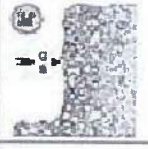



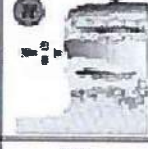
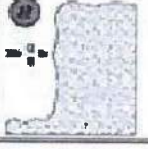
Project DS extent would be driveway for Big Oak Lodge (2508 Station Rd) and would extend US to first trib confluence. Project would continue up trib to treeline or farm road. Big Oak Lodge driveway (if permission is given) and/or farm road can be used for access. (Description continued below)

- Other Restoration Opportunities Present (Circle one) – None One Several

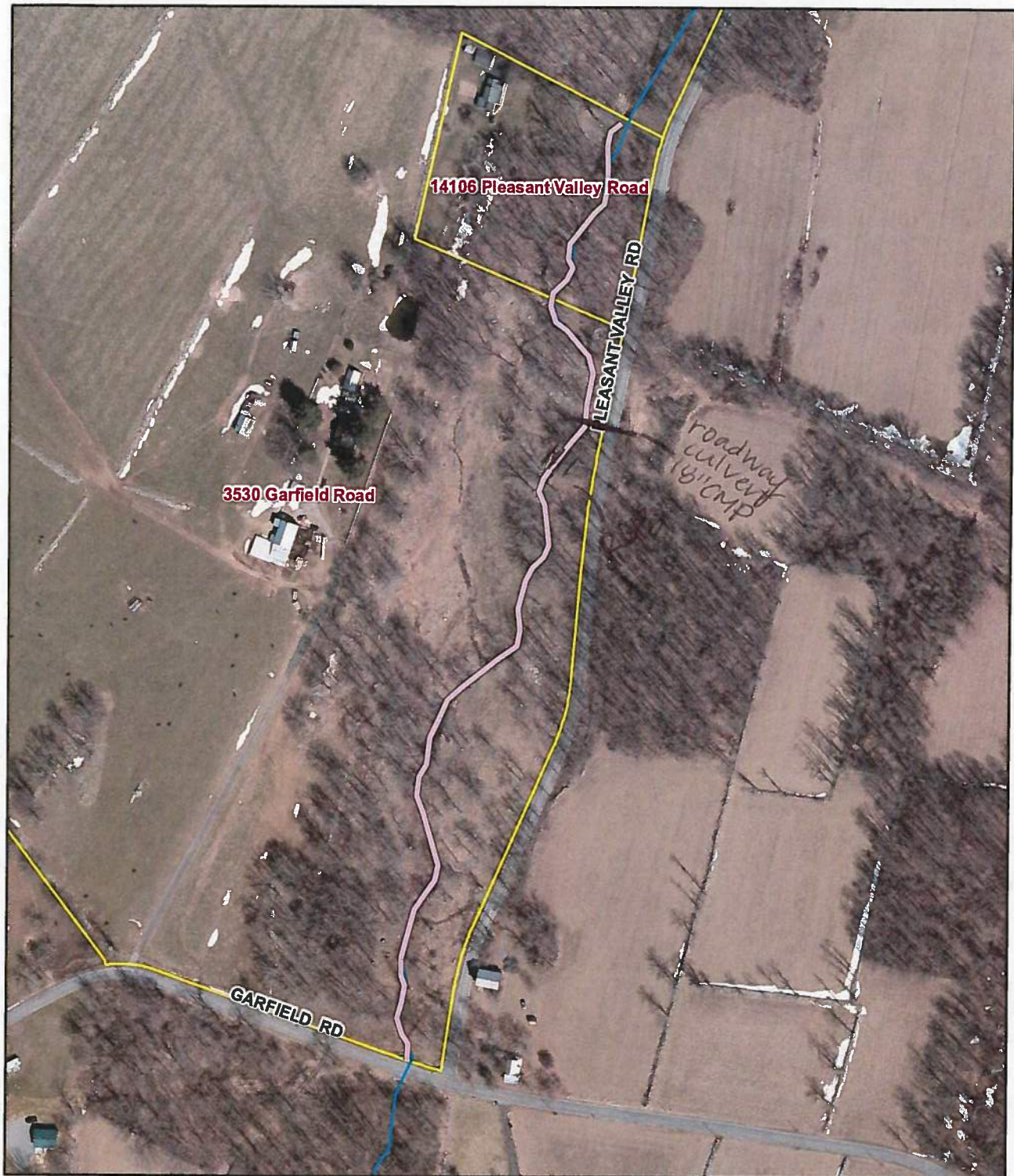
- If opportunities present, list types and locations (and mark on map):

- Fence out livestock from stream
- Reconnect stream to floodplain
- Plant trees in riparian area

## Bank Erosion Hazard Index (BEHI)




BANK EROSION POTENTIAL LOW MODERATE HIGH					
					
					
	BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

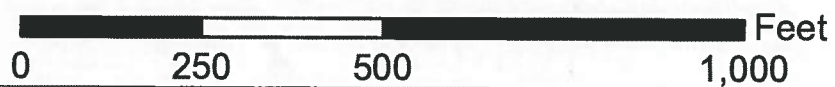
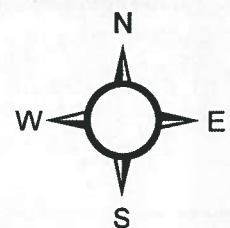
# Restoration Site MIDD-2018-STRE-0001



## Catoctin Creek Watershed Assessment



-  Streams
-  Restoration Opportunity
-  Parcel Boundaries



### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MIDD-2018-STRE-0001  
 Reach Number: 2 (DS reach)  
 Current Weather: Sunny, dry

Team Initials: MV, VH  
 Date: 6/26/18  
 Past Weather (24 hrs): Sunny, dry




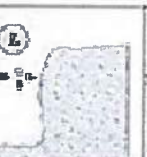



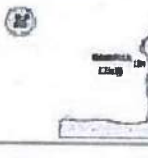
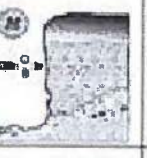





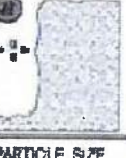
Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	FAR
2	F	F
3	NF	F
4	FAR	F
5	FAR	F
6	F	F
7	FAR	F
8	F	F

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) – Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):
    - Install cattle fencing around stream
    - Allow riparian wetland to establish in fenced-off areas and plant trees in floodplain to provide additional shading.
    - Reconnect a few incised/eroded areas to floodplain
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):

Restoration would take place on Hessong property, from northern property line to Garfield Rd.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW	Moderate	HIGH		
					
					
					
	BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE



# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: *MD00-2018-STRE-0001*  
 Reach Number: *1 (vs reach)*  
 Current Weather: *Sunny, dry*

Team Initials: *mv, VH*  
 Date: *6/26/18*  
 Past Weather (24 hrs): *Sunny, dry*

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	<i>F</i>	<i>NA</i>
2		
3		
4		
5		
6		
7		
8		

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
*Functioning stream reach, no potential for restoration*
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

# Restoration Site MIDD-2018-STRE-0002



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 1,500 2,000 2,500 3,000 Feet

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MIPD-2018-STRE-0002

Reach Number:

Current Weather: Sunny, warm

Team Initials: MV, CF

Date: 6/28/18

Past Weather (24 hrs):

8/9/18

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	Concentrated Flow <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	Floodplain Connectivity	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	Riparian Zone (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	Lateral Stability	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	Shelter for Fish and Macroinvertebrates (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	Sediment Supply (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	Temperature/Percent Shading (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	Detritus (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	NF	NA
2	FAR	
3	F	
4	F	
5	F	
6	F	
7	F	
8	F	✓

- Stream Restoration Potential (Circle one) – None Low Medium High

○ Is there potential for floodplain reconnection? (Circle one) - Yes No
















○ Restoration Notes (project type, constraints, access, environmental impacts, etc.):

*very nice stream. No recommended restoration projects.*

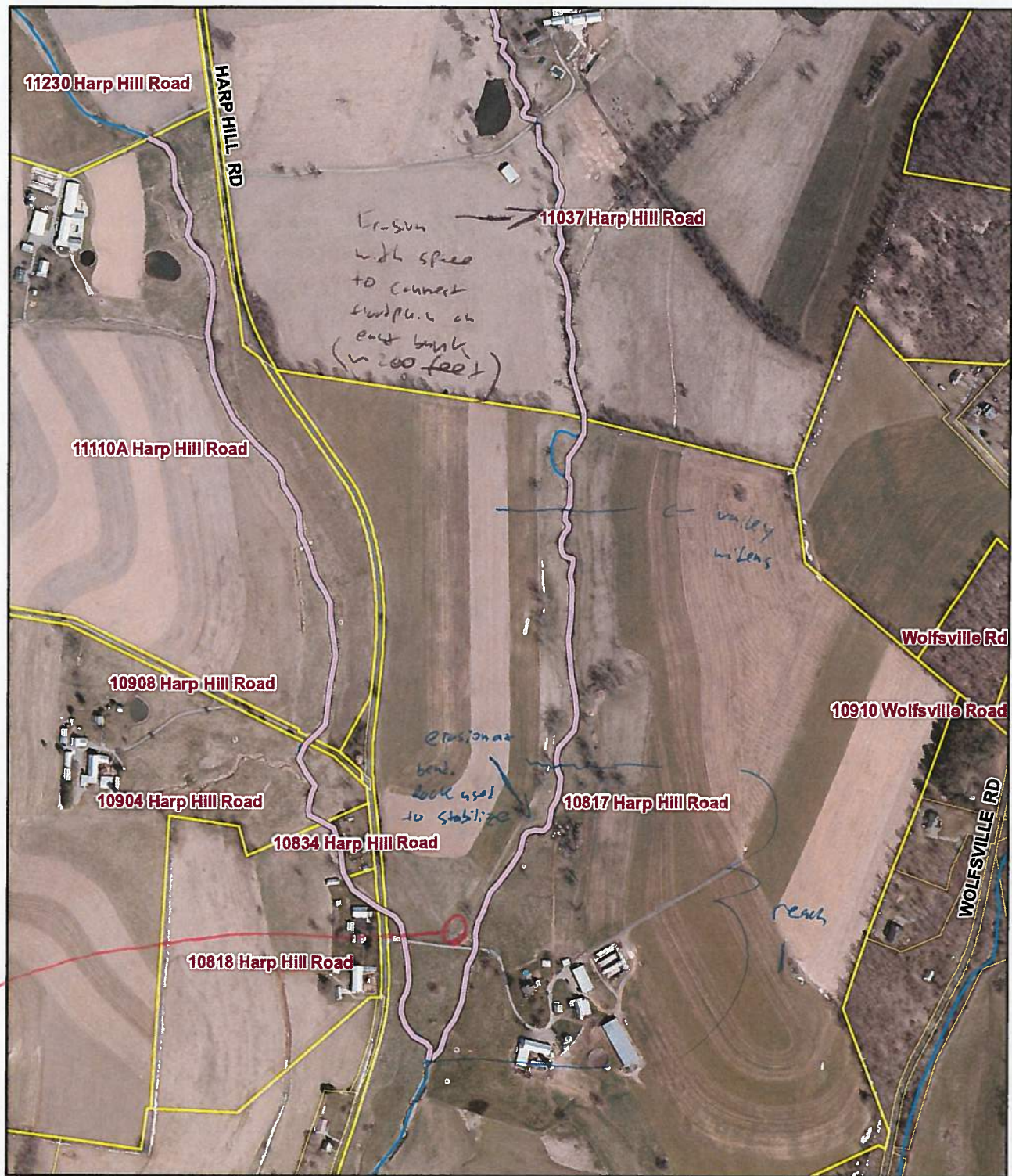
- Other Restoration Opportunities Present (Circle one) – None One Several

○ If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT VS BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

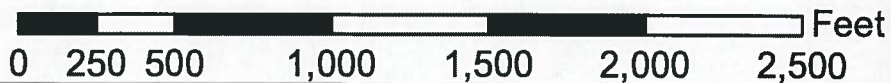
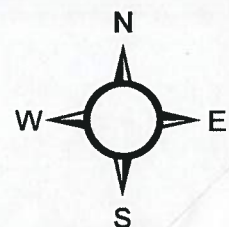
# Restoration Site MIDD-2018-STRE-0005



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MI DP-2018-SPRE-005  
 Reach Number: 1  
 Current Weather: Sunny, 50-60s

Team Initials: ML, SS  
 Date: 4/23/18  
 Past Weather (24 hrs): Sunny 50-60s

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent



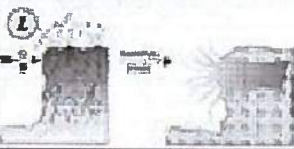




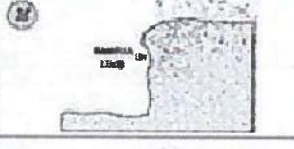






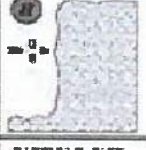
Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	
7	F	
3	NF	
4	F	
6	FAR	
6	F	
7	NF	
6	FAR	



- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):
    - Riparian buffer planting
    - Education for owners; No ATVs in stream
    - No instream work recommended
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):
    - Just tree planting

Riparian buffer  
plantings along entire  
stream reach

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: NR00-2018-STRE-0005  
 Reach Number: 2  
 Current Weather: Sunny, 50-60s

Team Initials: MV, JS  
 Date: 4/23/18  
 Past Weather (24 hrs): Sunny, 50-60s

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	
2	NF	
3	NF	
4	FAR	
5	NF	
6	FAR	
7	NF	
8	FAR	

- Stream Restoration Potential (Circle one) – None Low Medium High

- Is there potential for floodplain reconnection? (Circle one) - Yes No  
*- Valley is too narrow. would need to cut into steep slopes*
- Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
*- Tree Planting*

Riparian planting  
along entire stream  
reach

- Other Restoration Opportunities Present (Circle one) – None One Several

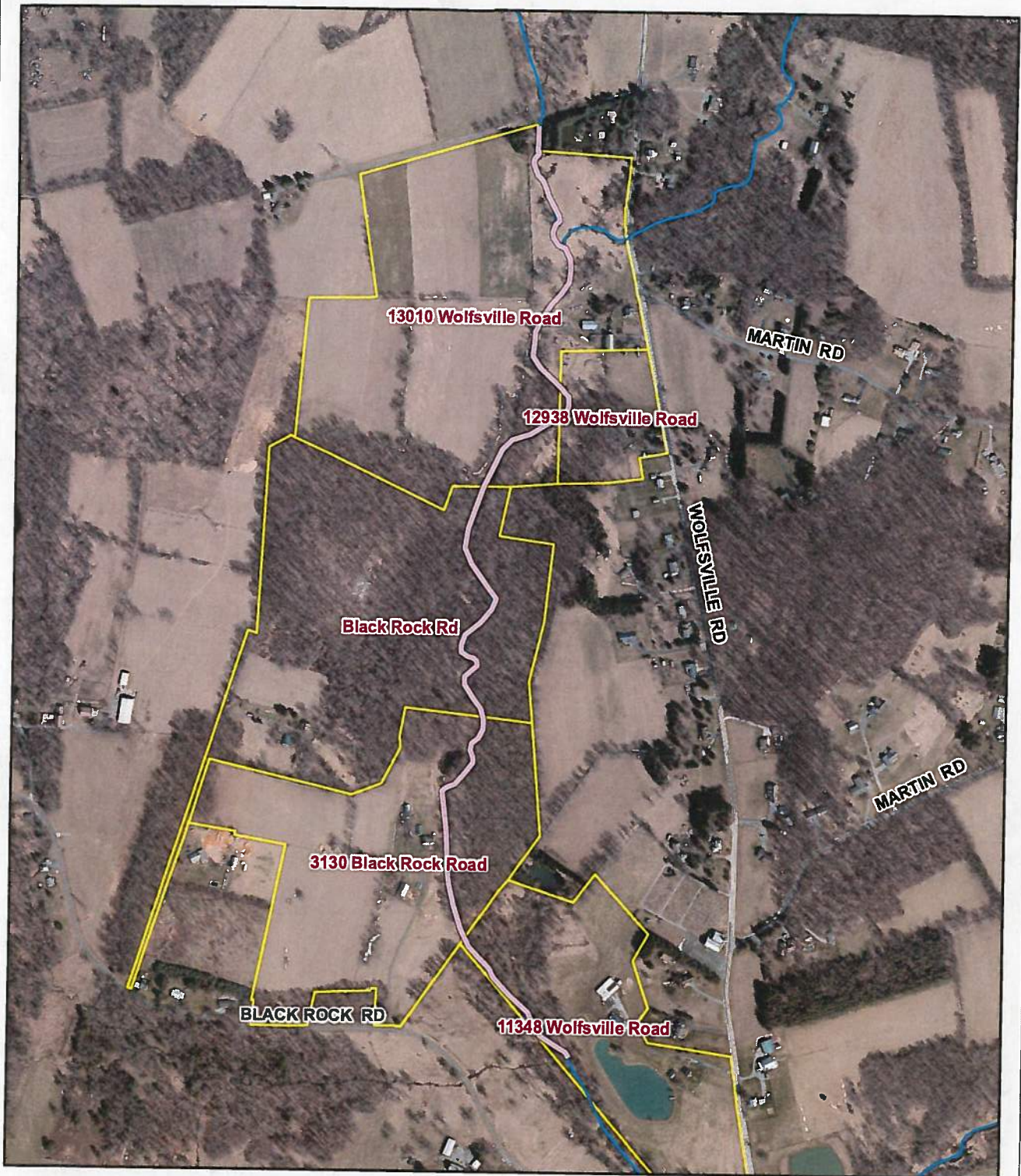
- If opportunities present, list types and locations (and mark on map):

*- Just tree plantings (Riparian buffer)*  
*- Potential for wetland enhancement project  
 at upstream seep.*

## Bank Erosion Hazard Index (BEHI)




BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

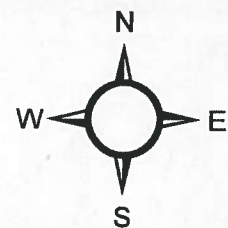
# Restoration Site MIDD-2018-STRE-0006



## Catoctin Creek Watershed Assessment



-  Streams
-  Restoration Opportunity
-  Parcel Boundaries



0 250 500 1,000 1,500 2,000 2,500 3,000 Feet

1. The first part of the document is a list of the names of the people who were present at the meeting.

2. The second part of the document is a list of the topics that were discussed during the meeting.

3. The third part of the document is a list of the actions that were taken during the meeting.

4. The fourth part of the document is a list of the decisions that were made during the meeting.

5. The fifth part of the document is a list of the conclusions that were reached during the meeting.

6. The sixth part of the document is a list of the recommendations that were made during the meeting.

7. The seventh part of the document is a list of the next steps that need to be taken.

8. The eighth part of the document is a list of the people who are responsible for carrying out the next steps.

9. The ninth part of the document is a list of the dates when the next steps are to be completed.

10. The tenth part of the document is a list of the people who are to be kept informed of the progress of the next steps.

11. The eleventh part of the document is a list of the people who are to be responsible for monitoring the progress of the next steps.

12. The twelfth part of the document is a list of the people who are to be responsible for reporting the progress of the next steps.

13. The thirteenth part of the document is a list of the people who are to be responsible for evaluating the progress of the next steps.

14. The fourteenth part of the document is a list of the people who are to be responsible for implementing the next steps.

15. The fifteenth part of the document is a list of the people who are to be responsible for reviewing the progress of the next steps.

16. The sixteenth part of the document is a list of the people who are to be responsible for reporting the progress of the next steps.

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MIDD-2018-STRE-0006  
 Reach Number: 2 (US reach)  
 Current Weather: Sunny, dry

Team Initials: MV, VH  
 Date: 6/26/18  
 Past Weather (24 hrs): Sunny, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	Concentrated Flow <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	Floodplain Connectivity	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	Riparian Zone (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	Lateral Stability	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	Shelter for Fish and Macroinvertebrates (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	Sediment Supply (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	Temperature/Percent Shading (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	Detritus (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	F
2	F	F
3	NF	F
4	F	F
5	FAR	F
6	F	F
7	NF	F
8	FAR	F

- Stream Restoration Potential (Circle one) – None Low Medium High
















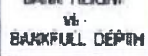

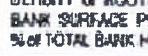


- Is there potential for floodplain reconnection? (Circle one) - Yes No → *Already connected in next areas*
- Restoration Notes (project type, constraints, access, environmental impacts, etc.):

*Plant trees in riparian area*  
**Tree plantings for non-forested riparian area.**

- Other Restoration Opportunities Present (Circle one) – None One Several

- If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
						
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: ME00-2018-SRE-0006  
 Reach Number: 1 (DS reach)  
 Current Weather: Sunny, dry

Team Initials: MY, VH  
 Date: 9/26/18  
 Past Weather (24 hrs): Sunny, dry

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	F
2	FAR	FAR
3	F	F
4		
5		
6		
7		
8		

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):  
*– Beautiful stream. No restoration project recommended.*
- Other Restoration Opportunities Present (Circle one) – None One Several
  - If opportunities present, list types and locations (and mark on map):

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

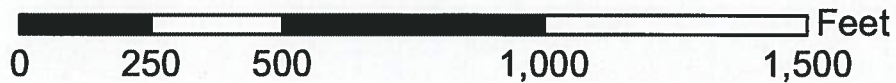
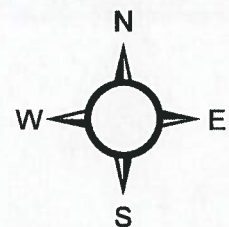
# Restoration Site MIDD-2018-STRE-0007



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



### Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MIDD-2018 STRE-0007

Reach Number: 2

Current Weather: Sunny, 50s-60s

Team Initials: MV, JS

Date: 4/23/18

Past Weather (24 hrs): Sunny, 50s-60s

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
8	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	0-39% shading assuming leaf-on	40-69% shading assuming leaf-on	≥70% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	F	
2	FAR	
3	NF	
4	FAR	
5	FAR	
6	F	
7	FAR	
8	F	

- Stream Restoration Potential (Circle one) – None Low Medium High
  - Is there potential for floodplain reconnection? (Circle one) - Yes No
  - Restoration Notes (project type, constraints, access, environmental impacts, etc.):

Riparian plantings  
along entire stream  
reach

– Riparian Butler Plantings

- Other Restoration Opportunities Present (Circle one) – None One Several

- If opportunities present, list types and locations (and mark on map):

– Potential for wetland enhancement in areas where seeps intersect valley and discharge onto floodplain (springs house, and near KPS stream pond).

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

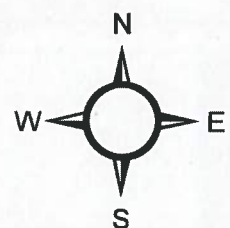
# Restoration Site MIDD-2018-STRE-0009



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 1,500 2,000 2,500 3,000 Feet

① 4" PVC pipe on West bank  
↳ draining field?

② ephemeral channel w/ concrete pipe

③ concrete weir  
↳ old dam

# Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: MIDD-2018-STRE-0009

Team Initials: MV, VK

Reach Number: 1 (Main channel US of bridge)

Date: 7/20/18

Current Weather: sunny, dry, warm

Past Weather (24 hrs): sunny, dry

grass, swale draining barn/house area

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
4	<b>Lateral Stability</b>	Stable banks/low BEHI ratings	Banks moderately resistant to erosion, some signs of active erosion present/moderate BEHI ratings	Actively eroding banks that will continue to erode/high BEHI
5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
6	<b>Sediment Supply</b> (Bed Stability)	Some point bars present, but are stable with little or no recent deposition	Point bars and lateral bars present; many of which are recent	Numerous alternating point bars, transverse bars, and/or mid-channel bars
<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	FAR	FAR
2	NF	F
3	NF	F
4	NF	F
6	FAR	F
6	FAR	F
2	NF	F
6	FAR	F

approx. 900 feet

- Stream Restoration Potential (Circle one) – None Low Medium High

- Is there potential for floodplain reconnection? (Circle one) Yes No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):







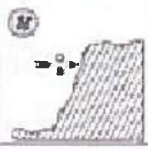




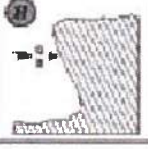



Proposed project extends from driveway crossings (OS) to woods (US). The stream has moved quite a bit in some areas (as seen in historic aerials), and severe erosion is present along some banks. Plenty of room available in floodplain for reconnection. Access from 10208 Church Hill Road driveway.

- Other Restoration Opportunities Present (Circle one) – None One Several

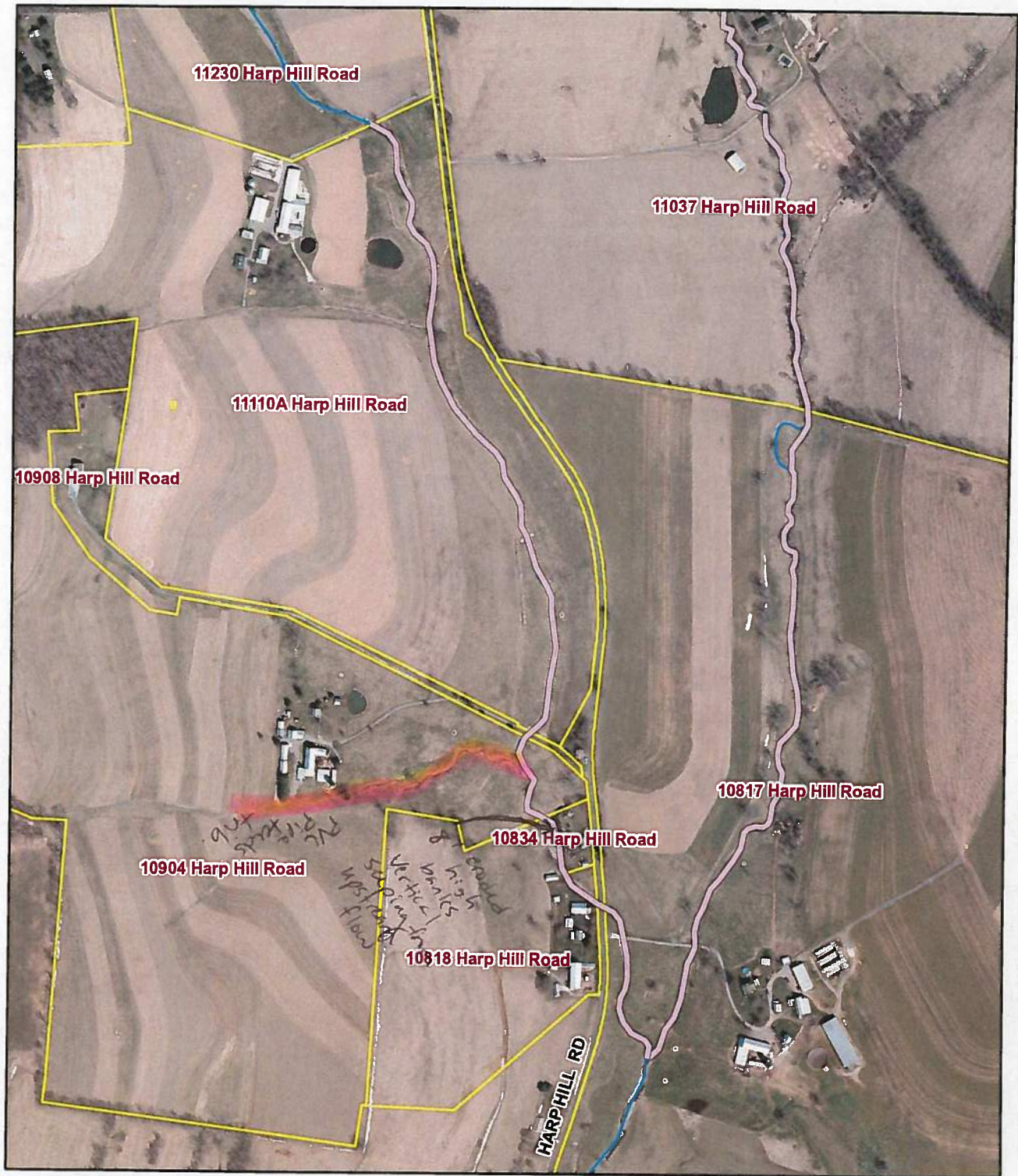
- If opportunities present, list types and locations (and mark on map):

A grass snout conveys runoff from barn area to the stream. Could retrofit snout as part of stream restoration project.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs. BANKFULL DEPTH	BANK ANGLE	DENSITY of ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE

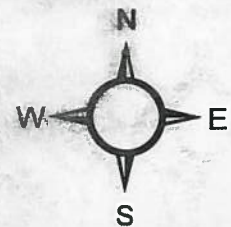
# Restoration Site MIDD-2018-STRE-0010



## Catoctin Creek Watershed Assessment



- Streams
- Restoration Opportunity
- Parcel Boundaries



0 250 500 1,000 1,500 2,000 2,500 Feet




Only had permission to walk Steve  
Leatherman property. Fence out cattle,  
stabilize banks, and plant trees in this  
area.

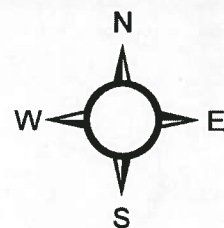
# Restoration Site MIDD-2018-STRE-0011



## Catoctin Creek Watershed Assessment



-  Streams
-  Restoration Opportunity
-  Parcel Boundaries



0 250 500 1,000 Feet

## Stream Assessment Criteria for Catoctin Creek Watershed

Site ID: *MIDD-2018-STRE-001*

Reach Number: *1*

Current Weather: *Sunny, dry*

Team Initials: *MY, VIT*

Date: *6/26/18*

Past Weather (24 hrs): *Sunny, dry*

Key	Assessment Parameter	Functioning (F)	Functioning-at-risk (FAR)	Not Functioning (NF)
<b>Hydrology</b>				
1	<b>Concentrated Flow</b> <sup>1,2</sup> (Runoff)	No potential for concentrated flow/impairments from adjacent land use	Some potential for concentrated flow/impairments to reach restoration site, but measures are in place to protect resources	Potential for concentrated flow/impairment to reach restoration site and no treatments in place
<b>Hydraulics</b>				
2	<b>Floodplain Connectivity</b>	Connected	Incised, some storm events can access floodplain	Incised, only very large storm events access floodplain
<b>Geomorphology</b>				
3	<b>Riparian Zone</b> (Riparian Vegetation)	>80% reach length has >25 foot corridor width	50-80% of reach length has >25 foot corridor width	<50% of reach has >25 foot corridor width
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5	<b>Shelter for Fish and Macroinvertebrates</b> (Bedform Diversity)	>70% of substrate favorable for epifaunal colonization and fish cover; mix of good habitat (see guidance for full description)	20-70% mix of stable habitat; suited for full colonization potential	<20% mix of stable habitat; lack of habitat is obvious; substrate is unstable or lacking
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<b>Physiochemical</b>				
7	<b>Temperature/Percent Shading</b> (Water Quality)	≥70% shading assuming leaf-on	40-69% shading assuming leaf-on	0-39% shading assuming leaf-on
8	<b>Detritus</b> (Organic Matter Processing)	Reach mainly consisting of leaves and wood without sediment covering it	Leaves and wood scarce; fine organic debris without sediment	Fine organic sediment – black in color and foul odor (anaerobic) or detritus absent

Key	Existing Condition Scores	Proposed Condition Scores (Highest Achievable)
1	<i>FAR</i>	<i>FAR</i>
2	<i>FAR</i>	<i>F</i>
3	<i>NF</i>	<i>NF</i>
4	<i>F</i>	<i>F</i>
5	<i>FAR</i>	<i>F</i>
6	<i>F</i>	<i>F</i>
7	<i>NF</i>	<i>NF</i>
8	<i>FAR</i>	<i>F</i>



- Stream Restoration Potential (Circle one) – None Low Medium High

- Is there potential for floodplain reconnection? (Circle one) - Yes No

- Restoration Notes (project type, constraints, access, environmental impacts, etc.):

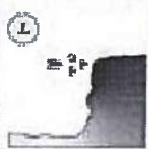



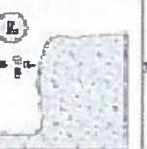




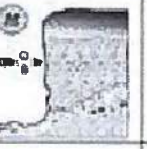




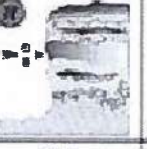
— Create an anabranching/multi-threaded stream that is able to easily spill onto floodplain. Allow adjacent area to become a riparian wetland. Plant trees adjacent to stream. Project would extend from Middle Point Rd to confluence with trib near US driveway.

- Other Restoration Opportunities Present (Circle one) None One Several

- If opportunities present, list types and locations (and mark on map):

Access via Middle Point Rd. and/or 4205 Wolfsville Rd. driveway.

## Bank Erosion Hazard Index (BEHI)

BANK EROSION POTENTIAL	LOW					
	MODERATE					
	HIGH					
		BANK HEIGHT vs BANKFULL DEPTH	BANK ANGLE	DENSITY OF ROOTS BANK SURFACE PROTECTION % of TOTAL BANK HEIGHT WITH ROOTS	SOIL STRATIFICATION	PARTICLE SIZE